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»R&D Management for Services«

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1.1 Competitive Differentiation by Innovative Services

Competition has significantly increased in many service markets in the past few years. This development has paralleled the increasing economic significance of services. Formerly sluggish markets change, new stakeholders appear and the market dynamics increase definitely. Above all, the following factors are considered causes for the increasing intensity of competition:

- Progressive opening up of markets and internationalization
- Appearance of new competitors, frequently from other industries
- Multiplication of successful service concepts
- Increasing market saturation and overcapacities

In such an environment, service enterprises do not distinguish themselves any more just by cost, image or quality advantages. Rather, differentiation by innovative offerings provides an important and unique distinction among competitors. The core challenges are, above all, to continuously offer improved and/or new services in the market, being faster than one's competitors and meeting the needs and expectations of the customers at the same time.

A recent study among 792 European enterprises shows that many service providers are well aware of the significance of this change and anticipate a considerable increase in sales with new services (Edvardsson et al. 2010). At the same time, these enterprises are confronted with the problem that current corporate structures and processes are not designed for efficient development and marketing of new services. In particular, they lack suitable sets of instruments for strategic and operative planning of development processes for services. Difficulties often begin because the services offered by enterprises are not clearly defined, i.e. there are no definite descriptions of the service contents, the relevant processes and the resources required (Bullinger et al. 2003).

On the part of science, an intensive discussion of issues relating to the development of new services has recently started. Although this subject is a high priority among researchers (Spath and Ganz 2008), it has not received any special focus in the study of business economics or engineering sciences. Most publications emphasize the importance of the development of new services, but they fail to provide specific assistance on how to embed these services into the strategic and operative management of enterprises.

In fact, the first scientific studies about "new service development" appeared in the Anglo-American publications as early as the 1970s and 1980s, but these could be characterized as rather rudimentary (Bowers 1985). In particular, they addressed fundamental framework conditions, success factors and obstacles for the development of new services. For a long time, specific instruments for practical application were only rarely developed. At least at present, activities relating to this subject have significantly increased, as is evidenced by a growing number of publications in the field(e. g. Gatignon 2010, Edvardsson et al. 2006, Edvardsson et al. 2000, Fitzsimmons and Fitzsimmons 2000).

In contrast with "new service development", which is biased by marketing, "service engineering" aims at a useful transfer of existing engineering know-how from traditional product engineering to the development of services. Hence, service engineering can be defined as the systematic development and design of services using suitable models, methods and tools. The concept of "service engineering" is found in literature as early as in the mid-1980s (e. g. Shostack 1982), but Albrecht and Zemke still noted at that : "The developing art/science of service engineering is so new that it really hasn't an agreed-upon name, much less an established body of principles and techniques" (Albrecht and Zemke 1985). The discussion of service engineering became significantly more dynamic only in the mid-1990s, with research initiatives in Germany and Israel. In the meantime, a wide spectrum of experience with tried-and-tested procedures and sets of instruments has become available (e. g. Salvendy 2010, Bullinger and Scheer 2003).

In addition to "new service development" and "service engineering", the concept of "service design" is also found in the literature. Service design in a narrower sense addresses predominantly the design of the perceivable elements of a service (e. g. colours, sounds, odours), as well as the interaction at the very interface with the customer (Moggridge 2007, Utterback et al. 2006). However, the concept is also understood more comprehensively, particularly in the Anglo-American region, where the term "design" traditionally refers to the complete structure of a product. Service design therefore addresses primarily procedures and methods for the development of new services. With regard to content, these publications are similar to those of service engineering (Ramaswamy 1996).

All in all, it can be stated that issues relating to the development of new service offerings have clearly gained in significance. While the first publications in this area dealt with fundamental subjects, such as the general development capability of services, a number of subsequent publications attempted to find specific solutions. Frequently, procedures and methods known from product and software engineering were adopted. More recently, research has focused on issues of customer integration in the development of

new services. Of late, employee integration and innovative culture in enterprises has also been studied. Another factor that is primarily interesting for practice is the study of suitable development systems, that is, primarily suitable organizational framework models for the creation of new service offerings.

1.2 Structures and Processes for Service Research and Development

Those enterprises in which the development of new services is not a one-time activity aim at launching new services continuously and successfully in the market. Such businesses are trying to find ways to design this process as efficiently as possible. In particular, they are trying to avoid double work, exclude a repetition of previously made errors and re-use existing knowledge.

Important starting points are the design of organizational structures and processes for service development. With regard to the question of organizational structures, the focus of interest is the assignment of responsibilities, that is, the definition of organizational units that are responsible for the development of services or organizational units that should be involved in that development. With regard to the design of the service development process, the order in which individual activities are performed is important. and these activities have to be supported with suitable methods and (software) tools.

Assignment of Organizational Responsibilities

Experience has shown that the first question that arises for enterprises investing more intensively in the development of new services is to identify who can take on this task in the enterprise and which organizational units should support this task. With increasing research and development activities, for example, the question arises as to whether it would be useful to create a separate department for this.

For the assignment of organizational responsibility for research and development of services, four basic alternatives may be considered (Bullinger and Meiren 2001):

- Establishing a dedicated organizational unit (e. g. Service Development)
- Adopting of the tasks by existing organizational units (e. g. Marketing, Sales)
- Setting up interdepartmental project teams
- Outsourcing to external business partners

To permanently root research and development within the enterprise, creation of a *dedicated organizational unit* is an option. The unit may take the form of a group, department or centre. An advantage of these organizational structures is that research and development activities are separated from day-to-day business and that know-how can be accumulated and made available directly. A disadvantage, however, is the high over-

head. It is possible that existing capacity may not be fully utilized if the service development activities have a more sporadic character.

Another option is the *adoption of R&D tasks by existing organizational units* (as an "extra assignment", as it were). The advantage is that required knowledge is available in a clearly defined organizational unit, while and the workload of the employees of this unit can be better controlled. This assumes that employees can be flexibly assigned to either services research or development tasks in addition to their usual functions. However, services research and development is often not considered a core competence in such organizational units, and it merely remains one of many activities.

A third option is *setting up interdepartmental project teams*. This solution involves the least amount of structural changes for the enterprise, and the project teams can be set up in a suitable way for each specific instance. However, a disadvantage is that the know-how accumulated in such projects is often lost after the end of the project, as employees return to their original departments and dedicate themselves to their usual tasks.

A fourth option is *outsourcing R&D assignments to external business partners*. This appears particularly advantageous if there is no or very little know-how about the development of services available in the enterprise or if this is not considered to be a core competency of the enterprise itself. However, a disadvantage is the overhead incurred – which should not be underrated – for the adaptation of externally developed service concepts to the actual situation in the enterprise. Moreover, it is probably not always easy to find suitable providers for services research and development tasks in the market.

Design of Development Processes

In addition to defining organizational structures, establishing development processes is another important field of action for service development. Process design may be based on approaches referred to as procedure models. Procedure models contain a detailed documentation of project flows, project structures and project responsibilities. They thereby support planning, controlling and monitoring of projects. Procedure models for the development of services

- define activities and their sequence required for the development of services,
- provide the basis for successful and efficient positioning of new services in the market by systematization of service development,
- have to meet the specific characteristics of services, including but not limited to ensuring the integration of the customer into the development process at an early stage.

To date, most procedure models are of a rather simple nature. They often follow a simple linear process and usually offer only a few configuration options (cf. Kim and Meiren 2010). On the other hand, many industry-specific concepts have been established and tested in practical application (e. g. Bullinger and Scheer 2003).

To bring procedure models for the development of services to life, it is decisively important to back these up with suitable methods and (software) tools. After examining the literature, it becomes evident that relatively few service-specific support services exist

(e. g., service blueprinting) and that methods and tools from product and software engineering are transferred to services instead (e. g., TRIZ, QFD, SADT, FMEA, UML). Especially because services to goods are affected by their high degree of intangibility and the significance of customer interaction, the adoption of product and software engineering approaches does not achieve the goal in many cases. Rather, adjustments need to be made to the specific services (Spath and Fähnrich 2007).

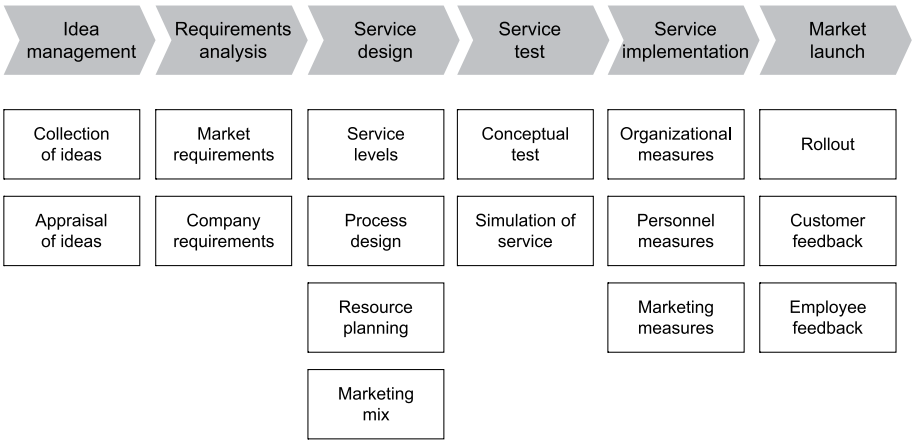

Fig. 3: Example of a development process for services (Ganz and Meiren 2010)

Another difference stems from process support for service development. Although the use of methods and tools is increasingly discussed in science and practice, so far no concepts exist for the consistent integration of methods and tools, as can be found in computer-aided design tools (CAD), in product development or computer-aided software engineering tools (CASE) in software development. In the area of service development, only rudimentary concepts for supporting platforms exist (Arai and Shimomura 2004), and only few prototypes have been developed for this, such as "CASET" (Scheer and Bullinger 2004) and "ServCASE" (Fähnrich and van Husen, 2008).

1.3 Results of the Expert Survey

The expert interviews explored the extent to which R&D management, with a focus on organizational issues, is a subject in the current scientific discussion of services. Above all, general trends in this area and new approaches for practical solutions were of interest. In addition, the experts were asked to assess the role of cooperation between science and practice in research and development in the domain of services.

System Thinking and Multidisciplinarity

The experts expressed the opinion that the level of knowledge and experience attained in the area of R&D management for services was still far from the level existing for products and software. All in all, there was a lack of fundamental models, procedures and methods. However, they stated almost unanimously that a mere transfer of concepts from the area of production and software would be insufficient. Although it was true that generic elements, such as, for example, individual process steps and methods, could be utilized, it was nevertheless necessary to adequately differentiate services. An example with regard to issues of customer integration would be the design of interactions and emotional "charging" in the area of services. In this context, some of the experts pointed out that the earlier discussions of new services had focused too much on the "service product" (above all in new service development and in service engineering) and gave too little attention to the overall "service system".

Moreover, the large majority of experts also demanded a multidisciplinary orientation to the research and development of services. Successful concepts should be integrative and holistic rather than segmented and specialized. It was important to encourage this multidisciplinary dialog and include as many areas of knowledge and research as possible. An overall and common point of orientation could be the question of which contribution can be made by a discipline to generating knowledge about how yields can be increased in and with services (rather than focusing primarily on the generation of knowledge for cost reduction). Business, engineering and IT were specific core disciplines, but many other disciplines, such as the social sciences, psychology and dramatics (e. g. with the concept of the service theatre) could also provide important building blocks for holistic research and the development of services.

Solutions in Practice

A majority of the experts also observed enterprises have become increasingly aware in the past few years of the fact that service innovations are a priority issue. In particular, enterprises were more willing to invest in the development of new service offerings and lay the foundations in the R&D management. Above all, large-scale enterprises developed strategies for new services, including specific objectives, roadmaps and budgets. However, it was also noted that the "level of discussion" in enterprises was often appallingly low, which could in turn be attributable to the lack of academic education in this field.

While product and software development usually lead to specialization in enterprises, which means that dedicated organizational units are established for these tasks, there is no "one best way" of service development according to the experts. Hence, many different forms of organization could be observed in practice. The establishment of a special organizational unit (e. g. Service Research, Service Development) is only one of many different options, one that tends to be found only in a few large-scale enterprises (predominantly banks, insurance companies, telecommunication companies, and IT service providers). Most frequently, the experts observe, the development of new services is realized either in the form of interdepartmental project teams or by existing organizational units, such as Marketing, Product Management or Sales as a "secondary assign-

ment". These are bodies that are close to the customers, which seems to be an important criterion for enterprises when assigning service development tasks. All in all, many indicators suggested that the development of new services is organized in a more distributed and often more team-oriented way than the development of products or software. Furthermore, some experts drew attention to the fact often different organizational structures exist in parallel for the development of new services. For example, some enterprises had dedicated staff functions for this task, while other organizational units also took care of it or additional interdepartmental projects were initiated. This was ultimately an indication that the development of services is not clearly arranged and that internal synergies were often utilized inadequately.

Another focus of the survey was the design of development processes. According to the experts, large corporations with world-wide activities usually have their own established processes for service development, while this was only rarely true for the vast majority of small- and medium-scale enterprises. Moreover, the development processes were neither very detailed nor formalized. With regard to formalization, the experts divided evenly into two groups. On the one hand, a formal design of the development processes for services was considered useful because it would be possible to achieve increases in efficiency similar to those in product or software development. On the other hand, some experts noted that the development of services called for creative approaches and a strong involvement of employees and could therefore not be packed into a "formal corset".

The question of important trends and perspectives within R&D management for services revealed a heterogeneous pattern. The experts mentioned a large number of different issues, including, above all, the consideration of emotional aspects. That is, the design of services in an intentionally emotional way, as early as in the development phase. This would thereby increase their attractiveness to both customers and employees. Other subject areas mentioned were the implementation of laboratory concepts for developing and testing services, the adaptation of new technologies in service enterprises and the handling of intellectual property rights, particularly the protection of service innovations.

Cooperation between Science and Practice

A final question concerned the cooperation between science and practice. Particularly in the processing industry, a long-standing and intensive cooperation exists between business and research institutions. This relates, for example, to financing of academic chairs and research projects, the systematic exchange of personnel and the organization of knowledge transfer. But what is the situation in the area of services? Which role does cooperation between science and practice play when it is about the implementation of service innovations?

The experts interviewed almost unanimously agreed that cooperation between business and academic institutions in the field of research and development of needs strong improvement. Specifically, there was a lack of joint projects and financial support. Acceptance usually increased only when technological content was involved.